

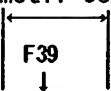
Potato type L	-50:-----MATANGAH-LFNHYS-SNS-RF IHFTSR-NTSKLFLT -17
Potato type L2	-81:-----MA-TFAVSGLNSISSISFNNFRSKNSNIL-LSRRRILLFS -42
Sweet potato type L	-43:-----M-----SR-LSGITP-RA-RDDRSQFQ-NPRLEIAVP -16
Fava bean type L	-64:MASMT-MRFHPNSTAVTESVPRRGSVYGF I-GYRSSS-LFV--RTNVIKY--RSVKRNLE -12
Arabidopsis thaliana type L	1:---MDTMRISGVSTGAEVL IQCN-SLSSLV-SRRCD---DGKWRTRMFARNRDLRPSPT 52
Spinach	1:---MATLPLSSTTPSTGRTENCFSYYSSSISRVMFGLKNGCNSK---LLFSSVNYKPMI 55
Rice type L	1:-----1
Rice type L2	1:-----MATASAPLQLATASRPLPVG-VGCGGGGGGLHVGGAR 37
Corn type L	1:-----GDDHLAAAAARHRLPPARLL LRRW-RGSPPRAVPE--VGSRR 39
Potato type H	1:-----1
Fava bean type H	1:-----1
Arabidopsis thaliana type H	1:-----1
Rice type H	1:-----1
Wheat	1:-----1
Citrus type H	1:-----1
E.coli MalQ	1:-----1

Potato type L	-16:K-TSHFR-RP-KRCFHVNTLSEK---IHHPITEQGGESDLSSF-APDA-ASIT-SSIKY 35
Potato type L2	-41:FRRRRRFSVSSVASDQKQKTKDSSDEGFT-LDVFO---PDSTSVLS---S-IKY 7
Sweet potato type L	-15:DRTAGLQ-RT-KRTLLVKCVLDETKQT IQHVTEKNEGTLDA---A-S-IA-SSIKY 35
Fava bean type L	-11:FRRRSAF-S-VKCGSGNEAKQVK-DQEVQGEAK-TSPS-SFA-PDT-TSIV-SSIKY 39
Arabidopsis thaliana type L	53:R-R-SF-LSVKSISSEP-KAKVT-DAVLDSEGEVF ISSMNPFA-PDA-ASVA-SSIKY 102
Spinach	56:MRGSRRICIVIRNVFSESKPKSEEP I EQETPSILNPLSN-LSPDSASRQS---S-IKY 108
Rice type L	1:-----RS-VAS-DRGVQGSVSP-EEEISSVLN-SIDS-STIA-SNIKH 37
Rice type L2	38:GGGAAPARR-RLAVRS-VAS-DRGVQGSVSP-EEEISSVLN-SIDS-STIA-SNIKH 87
Corn type L	40:VGVGVEGRLQRRVSARS-VAS-DRDVQGPVSP-AEGLPNVLN-SIGS-SAIA-SNIKH 91
Potato type H	1:-----MEGGAKSND-VSAA-P-IAQPLSEDPTD-IASN-IKY 32
Fava bean type H	1:-----MGFKVE-TNGGDG-SLVSAKVPLANPLAEKPDE-IASN-ISKY 39
Arabidopsis thaliana type H	1:-----MANA-N-GKAATS-LPEKISAKANPEADDATE-IAGN-IVY 36
Rice type H	1:-----MPESN-GAACGAAEKVKPAA-SPASEEPAA-IAGN-ISF 35
Wheat	1:-----M-SA-ADKVKPAA-SPASEDPSA-IAGN-ISKY 27
Citrus type H	1:-----NADAKA-N-GKNEAAKLA-KIPAAANPLANEPSA-IASN-ISKY 38
E.coli MalQ	1:-----MSQPIFND 8

Fig. 1A

## Positions of motif sequences 1L and 1H

		
Potato type L	36: HAEFTPVFSPE—RFE—LPKAFFATAQS—V—RDSLLINWNA—TYDIYEKLNMQ—AAYL	87
Potato type L2	8: HAEFTPSFSPE—KFELP—KAYYATAES—V—RDTLIMWNA—TYEFYEKMNKQ—AAYL	59
Sweet potato type L	36: HAEFSPAFSPE—RFE—LPKAYFATAQS—V—RDALIVNWNA—TYDYYEKLNMKQ—AAYL	87
Fava bean type L	40: HAEFTPLFSPE—KFE—LPQAFIATAQS—V—RDALIMWNA—TYDYYEKLNVKQ—AAYL	91
Arabidopsis thaliana type L	103: HAEFTPLFSPE—KFE—LPKAFFATAQS—V—RDALIMWNA—TYEYNNRVNVKQ—AAYL	154
Spinach	109: HAEFTPLFAPN—DFSLP—KAFFAAAQS—V—RDSLIMWNA—TYAHYEKMNMQ—AAYL	160
Rice type L	38: HAEFTPVFSPE—HFSPL—KAYHATAKS—V—LDTLIMWNA—TYDDYDRTNVKQ—AAYL	89
Rice type L2	88: HAEFTPVFSPE—HFSPL—KAYHATAKS—V—LDTLIMWNA—TYDDYDRTNVKQ—AAYL	139
Corn type L	92: HAEFAPLFSPE—HFSPL—KAYHATAKS—V—LDALLIMWNA—TYDDYNNKMNKQ—AAYL	143
Potato type H	33: HAQYTPHFSPE—KFEPLQ—AYYAAT—A—DSVRDLIKQWND—TYLHYDKVNPQ—TYYL	85
Fava bean type H	40: HAQYTPHFSPE—KFO—LQQAAYATA—E—S—VRDLIQWNE—TYLHFHKVDPKQ—TYYL	91
Arabidopsis thaliana type H	37: HAKYSPHFSPL—KFGPEQALYATAE—S—L—RDRLIQWNE—TYVHFNKVDPKQ—TYYL	88
Rice type H	36: HAQYSPHFSPL—AFGPEQAFYSTAE—S—V—RDHLVQRWNE—TYLHFHKTDPKQ—TYYL	87
Wheat	28: HAQYSPHFSPL—AFGPEQAFYSTAE—S—V—RDHLVQRWNE—TYLHFHKTDPKQ—TYYL	79
Citrus type H	39: HVQYSPHFSPT—KFEPEQAFYSTAE—V—V—RDRLIQWNE—TYVHFNKVDPKQ—TYYL	90
E.coli MalQ	9: KQFQEA—LSRQWRYGLNSAAEMTPQWMLAVSEALAEMLRAQPFAPVANQR—HVN—YI	65

## Position of motif sequence 2


		
Potato type L	88: SMEFLQGRALLNAIGNLELTGAF AEALKNLGHNLNENVASQEPDAALGNGGLGRLASCFLD	147
Potato type L2	60: SMEFLQGRALLNAIGNLGLTGPYADALTKLGYSLQEDVARQEPDAALGNGGLGRLASCFLD	119
Sweet potato type L	88: SMEFLQGRALLNAIGNLELTGEYAEALKNLGHNLNENVASQEPDAALGNGGLGRLASCFLD	147
Fava bean type L	92: SMEFLQGRALLNAIGNLELTGPYAEALSQLSYKLEDVAHQEPDAALGNGGLGRLASCFLD	151
Arabidopsis thaliana type L	155: SMEFLQGRALLNAIGNLELTGAYADALKNLGHNLNENVASQEPDAALGNGGLGRLASCFLD	214
Spinach	161: SMEFLQGRALLNAIGNLELTGAYADALKNLGHNLNENVASQEPDAALGNGGLGRLASCFLD	220
Rice type L	90: SMEFLQGRALTNVGNLELTGQYAEALQQLGHSLEDVATQEPDAALGNGGLGRLASCFLD	149
Rice type L2	140: SMEFLQGRALTNVGNLELTGQYAEALQQLGHSLEDVATQEPDAALGNGGLGRLASCFLD	199
Corn type L	144: SMEFLQGRALTNVGNLELTGQYAEALQQLGHSLEDVATQEPDAALGNGGLGRLASCFLD	203
Potato type H	86: SMEYLQGRALTNVGNLIDHAYADALKNLGOQLEEVVEQEKDAALGNGGLGRLASCFLD	145
Fava bean type H	92: SMEYLQGRALTNVGNLIDHAYADALKNLGOQLEEVVEQEKDAALGNGGLGRLASCFLD	151
Arabidopsis thaliana type H	89: SMEYLQGRALTNVGNLIDHAYADALKNLGOQLEEVVEQEKDAALGNGGLGRLASCFLD	148
Rice type H	88: SMEYLQGRALTNVGNLITGAYAEAVKKFGYELEALVGQEKDAALGNGGLGRLASCFLD	147
Wheat	80: SMEYLQGRALTNVGNLITGAYADALKNLGOQLEEVVEQEKDAALGNGGLGRLASCFLD	139
Citrus type H	91: SMEYLQGRALTNVGNLITGAYADALKNLGOQLEEVVEQEKDAALGNGGLGRLASCFLD	150
E.coli MalQ	66: SMEYLIGRLTGNLLNLGWYQDVQDSLKAYDINLTDLLEEDIPALGNGGLGRLAACFLD	125

Fig. 1B

Potato type L	148: SLATLNYPAGGYGLRYKYGLFKQRI TKDGQEEVAEDWLEIGSPWEVVRN-DV-SYPVKFY	205
Potato type L2	120: SMATLNYPAGGYGLRYQYGLFKQLITKDGQEEVAENWLEMGNPWEIVRN-DI-SYPVKFY	177
Sweet potato type L	148: SLATLNYPAGGYGLRYKYGLFKQRI TKDGQEEVAEDWLELGNPWEIIRM-DV-SYPVKFF	205
Fava bean type L	152: SLATLNYPAGGYGLRYKYGLFKQRI TKDGQEEVAEDWLEMGNPWEIVRN-DV-SYPVRFY	209
Arabidopsis thaliana type L	215: SMATLNYPAGGYGLRYKYGLFKQRI TKDGQEEAAEDWLELGNPWEIVRN-DV-SYPVKFY	272
Spinach	221: SLATLNYPAGGYGLRYKYGLFKQMI TKDGQEEVAENWLEIANPWELVRN-DV-SYSIKFY	278
Rice type L	150: SLATLNYPAGGYGLRYKHGLFKQII TKDGQEEVAENWLEMGNPWEIVRT-DV-SYPVKFY	207
Rice type L2	200: SLATLNYPAGGYGLRYKHGLFKANHTKDGQEEVAENWLEMGNPWEIVRT-DV-SYPVKFY	257
Corn type L	204: SLATLNYPALGYGLRYEYGLFKQII TKDGQEEIAENWLEMGPWEVVRN-DV-SYPVKFY	261
Potato type H	146: SMATLNLPAGGYGLRYRYGLFKQLITKAGQEEVPEDWLEKFSPEIVRH-DV-VFPIRFF	203
Fava bean type H	152: SMATLNLPAGGYGLRYRYGLFKQII TKAGQEEVAEDWLEKFSPEIVRH-DV-LYPIRFF	209
Arabidopsis thaliana type H	149: SMATLNLPAGGYGLRYRHGLFKQII TKKGQEEIPEDWLEKFSPEIVRH-DV-VFPVRFF	206
Rice type H	148: SMATLNLPAGGYGLRYRYGLFKQCI TKAGQEEIAEDWLEKFSPEIVRH-DI-VYPIRFF	205
Wheat	140: SMATLNLPAGGYGLRYRYGLFKQRI AKAGQEEIAEDWLDKFSPEIVRH-DV-VYPIRFF	197
Citrus type H	151: SMATLNLPAGGYGLRYRYGLFKQCI TKAGQEEVAEDWLEKFSPEVVRH-DV-VFPVRFF	208
E. coli Ma10	126: SMATVGSATGYGLNYQYGLFRQSFVDGKQVEAPDDWHSNYPWF—RHNEALDVQVGIG	183

Potato type L	206: GKVSTGSDGKRYWIGGEDIKAVAYDVPIDGYKTRTTISLRLWSTQVPSADFDLSAFNAGE	265
Potato type L2	178: GKVIEGADGRKEWAGGEDITAVAYDVPIDGYKTKTTINLRLWTTKLAAEAFDLYAFNNGD	237
Sweet potato type L	206: GKVITGSDGKKHWIGGEDILAVAYDVPIDGYKTRTTISLRLWSTKVPSEDFDLYSFNAGE	265
Fava bean type L	210: GKVVSGSDGKKHWVGGEDIKAVAHDPIDGYKTRSTINLRLWSTKAASEEFDLNAFNNGR	269
Arabidopsis thaliana type L	273: GKVVFGSDGKKRWIGGEDIVAVAYDVPIDGYKTKTTINLRLWSTKAPSEDFDLSSYNNGK	332
Spinach	279: GKVVFGSDGRSHWIGGEDIRAVAYDVPIDGYTKTTINLRLWCTTVSSEDFDLAFNAGE	338
Rice type L	208: GKVVEGTDGRMHWIGGENIKVVAHDIPIDGYKTKTTNNLRLWSTTVPSQDFDLEAFNAGD	267
Rice type L2	258: GKVVEGTDGRMHWIGGENIKVVAHDIPIDGYKTKTTNNLRLWSTTVPSQDFDLEAFNAGD	317
Corn type L	262: GKVVEGTDGRKHWIGGENIKAVAHDPIDGYKTRTTNNLRLWSTTVPAQDFDLAFAFNSGD	321
Potato type H	204: GHVEVLPSGSRKWVGGEVLNALAYDVPIDGYRTKNTNSLRLWEAKASSEDFNLFLFNDGQ	263
Fava bean type H	210: GQVEVNPDSRQWIGGEVILQALAYDVPIDGYTKNTISLRLWEAKACADDFDLFLFNDGQ	269
Arabidopsis thaliana type H	207: GKVOVNPDSRKWVDGDVVQALAYDVPIDGYTKNTISLRLWEAKARAEDDLDFQFNEGE	266
Rice type H	206: GHVEILPDGSRKWVGGEVLNALAYDVPIDGYTKNAISLRLWDAKASAEFNLFOFNDGQ	265
Wheat	198: GHVEISPDGKRKWAGGEVLNALAYDVPIDGYTKNAISLRLWDATAEDFNLFOFNDGQ	257
Citrus type H	209: GSVNVNPNPTRKWVGGEVVQAVAYDIPIDGYTKNTISLRLWDAKASAEFNLFOFNDGQ	268
E. coli Ma10	184: GKVTK—DGR—WEPEFTITGQAWDLVVGYRNGVAQPLRLWQATHAP—FDLTKFNDGD	238

Fig. 1C

Potato type L	266:HTKACEAQANAEEKICYILYPGDESEEGKILRLKQOYTLCSASLQDIISRFERRSGDRIK-	324
Potato type L2	238:HAKAYEAQKAEEKICYVLYPGDESLEGKTLRLKQOYTLCSASLQDI IARFEKRSGNAVN-	296
Sweet potato type L	266:HTKACEAQANAEEKICYILYPGDESIEGKILRLKQOYTLCSASLQDI IARFERRSGEYVK-	324
Fava bean type L	270:HTEASEALANAEEKICYILYPGDESIEGKTLRLKQOYTLCSASLQDI IARFERRSGASVN-	328
Arabidopsis thaliana type L	333:HTEAAEALFNAEKICFVLYPGDESTEGKALRLKQOYTLCSASLQDI IARFETRSGGNVN-	391
Spinach	339:HAKANEARANAEEKICSVLYPGDESMEGKILRLKQOYTLCSASLQDI ISQFERRSGEHN-	397
Rice type L	268:HASAYEAHLNAEKICHVLYPGDESPEGKVLRLKQOYTLCSASLQDI IARFERRAGDSLS-	326
Rice type L2	318:HASAYEAHLNAEK-----P-----HY-----R-DI IARFERRAGDSLS-	349
Corn type L	322:HTKAYEAHLNAEKICHILYPGDESLEGKVLRLKQOYTLCSASLQDI IARFESRAGESLN-	380
Potato type H	264:YDAAQLHSRAQQICAVLYPGDATENGKLLRLKQOYFLCSASLQDI IARFKEREDGKGSH	323
Fava bean type H	270:LESASVLHSRAQQICSVLYPGDATEGGKLLRLKQOYFLCSASLQDI ISRFKERRQG-----	325
Arabidopsis thaliana type H	267:YELAAQLHSRAQQICTVLYPGDATENGKLLRLKQOYFLCSASLQDI ISRFHERSTTEGSR	326
Rice type H	266:YESAAQLHARAQQICAVLYPGDATEEGKLLRLKQOYFLCSASLQDI IFRFKERKADRVSG	325
Wheat	258:YESAAQLHSRAQQICAVLYPGDATEEGKLLRLKQOYFLCSASLQDI IFRFKERKADRVSG	317
Citrus type H	269:YESAAQLHSRAQQICAVLYPGDSTEEGKLLRLKQOYFLCSASLQDI IFRFKERKS-----GR-	325
E.coli Ma10	239:FLRAEQQGINAEKLTKVLPNDNHTAGKLLRLMQOYFQCACSVADILRRH-HLAG-----R	293
Potato type L	325:-WEE-FPEKVAVQMNNDHTPTLCIPELMRILIDLKGLNWNEAWNITORTVAYTNHTVLP	380
Potato type L2	297:-WDQ-FPEKVAVQMNNDHTPTLCIPELLRILMDVKGLSWKQAWETORTVAYTNHTVLP	352
Sweet potato type L	325:-WEE-FPEKVAVQMNNDHTPTLCIPELIRILIDLKGLSWKEAWNITORTVAYTNHTVLP	380
Fava bean type L	329:-WED-FPEKVAVQMNNDHTPTLCIPELMRILIDIKGLSWKDAWNITORTVAYTNHTVLP	384
Arabidopsis thaliana type L	392:-WEE-FPEKVAVQMNNDHTPTLCIPELMRILNDLKGLSWEDAWNITORTVAYTNHTVLP	447
Spinach	398:-WEE-FPEKVAVQMNNDHTPTLCIPELMRILIDVKGLAWKEAWNITORTVAYTNHTVLP	453
Rice type L	327:-WED-FPSKVAVQMNNDHTPTLCIPELMRILIDVKGLSWNEAWSITERTVAYTNHTVLP	382
Rice type L2	350:-WED-FPSKVAVQMNNDHTPTLCIPELMRILIDVKGLSWNEAWSITERTVAYTNHTVLP	405
Corn type L	381:-WED-FPSKVAVQMNNDHTPTLCIPELMRILMDVKGLSWSEAWSITERTVAYTNHTVLP	436
Potato type H	324:Q-WS-EFPKVAIQLNDHTPTLTIPELMRLMDDEGLGWDESWNITRTIAYTNHTVLP	380
Fava bean type H	326:PWWS-EFPTKVAVQLNDHTPTLSIPELMRLMDDEGLGWDEAWVTSTVAYTNHTVLP	384
Arabidopsis thaliana type H	327:KWS-EFPSKVAVQMNNDHTPTLAIPELMRLMDNGLGWDEAWDVSTVAYTNHTVLP	383
Rice type H	326:KWS-EFPAKVAVQLNDHTPTLAIPELMRLMDVEGLGWDEAWDITNKTIAYTNHTVLP	382
Wheat	318:KWS-EFPSKVAVQMNNDHTPTLAIPELMRLMDVEGLGWDEAWTNKTVAYTNHTVLP	374
Citrus type H	326:QWS-EFPSKVAVQLNDHTPTLAIPELMRLMDDEGLGWDEAWDITRTVAYTNHTVLP	382
E.coli Ma10	294:ELHELADYEV-IQLNDHTPTIAIPELLRVLIDEHOMSWDDAWAITSKTFAYTNHTLMP	350

Fig. 1D

Potato type L	381: EALEKWSYELNQKLLPRHVEI IEAIDEELVHEIVLKYGSMDLNKLEKLTMMRI LENFDL	440
Potato type L2	353: EALEKWSFTLLGELLPRHVEI IAMIDEELLHTILA EYGTEDLDLLOEKL NQMRIL DNVEI	412
Sweet potato type L	381: EALEKWSYELMEKLLPRHVEI IEMIDEQLINEIVSEYGTSDLDMLKEL NDMRI LENFDI	440
Fava bean type L	385: EALEKWSMDLMEKLLPRHVEI IEMIDEELIRTIIAEYGTADSLLDKKLKEMRI LENVEL	444
Arabidopsis thaliana type L	448: EALEKWSLELMEKLLPRHVEI IEKIDEELVRTIVSEYGTADPDLEEKLKAMRI LENVEL	507
Spinach	454: EALEKWSFELMQSLLPRHVEI IEKIDEELVDTIVSEYGTDDPKLLMGKLNELRI LENFHL	513
Rice type L	383: EALEKWSLDIMQKLLPRHVEI IEKIDGELMNI IISKYGTEDTSLKKKIKEMRI LDNIDL	442
Rice type L2	406: EALEKWSLDIMQKLLPRHVEI IEKIDGELMNI IISKYGTEDTSLKKKIKEMRI LDNIDL	465
Corn type L	437: EALEKWSLDIMQKLLPRHVEI IETIDEELINNI VSKYGTDTTELLKKKIKEMRI LDNVDL	496
Potato type H	381: EALEKWSQAVMYKLLPRHMEI IEEIDKRFVATIMS—ERP—DLENKMPS—NRIL—	430
Fava bean type H	385: EALEKWSQPMYKLLPRHMEI IEEIDRRFVALISK—TRL—DLEDEVS—NRIL—	434
Arabidopsis thaliana type H	384: EALEKWSQSLMYKLLPRHMEI IEEIDKRFVQTRD—TRV—DLEDKISS—LSIL—	433
Rice type H	383: EALEKWSQIVMRKLLPRHMEI IEEIDKRFKEMVIS—TRK—EMEGKIDS—NRIL—	432
Wheat	375: EALEKWSQAVMYKLLPRHMEI IEEIDKRFREMVIS—TRK—DMEGKIES—NRVL—	424
Citrus type H	383: EALEKWSQAVMYKLLPRHMEI IEEIDKRFIAMVRS—TRS—DLESKIPS—MCIL—	432
E. coli MalQ	351: EALERWDVKLVKGLPRHMQI INEINTR—F—KT—L—	382
Potato type L	441: PSSVAELFIKPEISVDDDTETVEVHD—KVEASDKVVTNDEDDTGKKTsvkieAAAE—	495
Potato type L2	413: PSSVLELLIKAE—SAADV—E—KAADEEQEEEGKDD—SKDEETEA—VKAETTNEE	462
Sweet potato type L	441: PSSIANLFTKPK—ET—SIVDPSE—EVEVSGKWVTSVEVSDKVVTESEKDELEE—	491
Fava bean type L	445: PAEFADILVKTKEATDISSEEVQIS—KEGGEEEE—TSKEGGEEEEKEVGGGREGDDG	502
Arabidopsis thaliana type L	508: PSAFADVIVKPVNKPVTAKDA—QNGV—KTEQEE—EKTA—GEEED—	548
Spinach	514: PSSVASII—KDKITCQVDE—D—KKI—EIS—DEVD—GLVWVEESE—	551
Rice type L	443: PDSIAKLFVKPKKESPAKLKEKLLVK—SL—EPSVWVEEKTsvkv—EINEDSEEVEVD	498
Rice type L2	466: PDSIAKLFVKPKKESPAKLKEKLLVK—SL—EPSVWVEEKTsvkv—EINEDSEEVEVD	521
Corn type L	497: PASISQLFVKPKKESPAKSKQKLLVK—SL—ETIVEVEEKTELEEEAEVLSEIEEEKLE	554
Potato type H	431: —————DH—————N—————	433
Fava bean type H	435: —————DN—————N—————	437
Arabidopsis thaliana type H	434: —————DN—————N—————	436
Rice type H	433: —————DN—————S—————	435
Wheat	425: —————DN—————N—————	427
Citrus type H	433: —————DN—————N—————	435
E. coli MalQ	383: —————V—————EKTWPGDEKvWAK—LAV—————	399

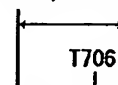
Fig. 1E

Potato type L	496:K-----DIDKTPVS-----PEPAVIPPKKVRMANLCVVGGHAVNGVAEIHSE	538
Potato type L2	463:EETEKKVEVEDSQAIK-----RIFG-PHPNKPQV---VHMANLCVVGSHAVNGVAEIHSE	515
Sweet potato type L	492:K-----DTELEKDED-----PVPAPIPPKMVRMANLCVVGGHAVNGVAEIHSD	534
Fava bean type L	503:KEDEVEKAI AEKDGTVKSSIGDKKKLPEPVPVPPKLRMANLCVVGSHAVNGVAEIHSE	562
Arabidopsis thaliana type L	549:---EV-----IPEPTVEPPKMVRMANLAVVGSHAVNGVAEIHSE	584
Spinach	552:-EGDIEKQAVEEPVPK-----PAKL---VRMANLCVVGSHAVNGVAEIHSD	593
Rice type L	499:SEEVVEAENEDSELDPFV-KSD---PKL-PRV-VRMANLCVVGSHVNGVAAIHSE	550
Rice type L2	522:SEEVVEAENEDSELDPFV-KSD---PKL-PRV-VRMANLCVVGSHVNGVAAIHSE	573
Corn type L	555:SEEVAAEEAS-SELDLPFV-KSD---PKL-PRV-VRMANLCVVGSHVNGVAEIHSE	605
Potato type H	434:-----ATK-PVV-HMANLCVVSHTVNGVAQLHSD	461
Fava bean type H	438:-----LQK-PVV-RMANLCVVSHTVNGVAQLHSD	465
Arabidopsis thaliana type H	437:-----PQK-PVV-RMANLCVVSHTVNGVAQLHSD	464
Rice type H	436:-----NPQKPVV-RMANLCVVSHTVNGVAELHSD	464
Wheat	428:-----P-EKPVV-RMANLCVVSHTVNGVAELHSD	455
Citrus type H	436:-----PKK-PVV-RMANLCVVSHTVNGVAQLHSD	463
E.coli MalQ	400:-----VHD-----KQV-----HMANLCVVGGAFAVNGVAALHSD	427
Potato type L	559:IVKEEVFNDFYELWPEKFQNKTNNGVTPRRWIRFCNPPLSAIITKWGTEDWVLKTEKLA	598
Potato type L2	516:IVKDEVFNDFYKLWPEKFQNKTNNGVTPRRWLSFCNPELSEIITKWGTSDDWLVNTEKLA	575
Sweet potato type L	535:IVKEDVFNDYFYLWPEKFQNKTNNGVTPRRWIRFCNPALSNITKWIGTEDWVLNTEKLA	594
Fava bean type L	563:IVKDDVFNAFYKLWPEKFQNKTNNGVTPRRWIRFCNPDLSKIITQWIGTEDWVLNTEKLA	621
Arabidopsis thaliana type L	585:IVKQDVFNDFVQLWPEKFQNKTNNGVTPRRWIRFCNPYLSDIITNWIGTEDWVLNTEKVA	644
Spinach	594:IVKEQVFRDFELWPEKFQNKTNNGVTPRRWIRFCNPELSEILTKWIGSDDWVLNTEKLA	653
Rice type L	551:IVKEDVFNSFYEMWPAKFQNKTNNGVTPRRWIRFCNPALSAISKWIGSDDWVLNTEKLA	610
Rice type L2	574:IVKEDVFNSFYEMWPAKFQNKTNNGVTPRRWIRFCNPALSAISKWIGSDDWVLNTEKLA	633
Corn type L	606:IVKQDVFNDFYEMWPAKFQNKTNNGVTPRRWIRFCNPALSAISKWIGSDDWVLNTEKLA	665
Potato type H	462:ILKAELFADYVSVPWTKFQNKTNNGITPRRWIRFCSPELSHIITKWLKTDQWVTNLELLAN	521
Fava bean type H	466:ILKSELFASYVSIWPTKFQNKTNNGITPRRWIRFCSPELSRITKWLKTDQWVTNLDLLTG	525
Arabidopsis thaliana type H	465:ILKAELFADYVSIWPNKFQNKTNNGITPRRWIRFCSPELSDIITKWLKTDQWVTNLDLLTG	524
Rice type H	465:ILKEELFADYLSIWPKNKFQNKTNNGITPRRWIRFCNPELSEIVTKWLKTDQWVTNLDLLTG	524
Wheat	456:ILKQELFADYVSIWPKNKFQNKTNNGITPRRWIRFCNPELSEIVTKWLKTDQWVTNLDLLTG	515
Citrus type H	464:ILKADLFADYVSLWPNKLQNKTNNGITPRRWIRFCNPALSAITKWLKTDQWVTNLDLLVG	523
E.coli MalQ	428:LVVKDLFPYHQLWPNKFHNVTNGITPRRWIKOCNPALALLDKSLQKE-WANDLDQLIN	486

Fig. 1F

Potato type L	599:LQKFADNEDLQNEWREAKRSNKIKVVSFLKEKTGYSVVPDAMFDIQVKRIHEYKRQLLN	658
Potato type L2	576:LRKFADNEELOSEWRKAKGNKMKIVSLIKEKTGYVSPDAMFDVQIKRIHEYKRQLLN	635
Sweet potato type L	595:LRKFADNEDLQIEWRAAKRSNKVKVASFLKERTGYSVSPNAMFDIQVKRIHEYKRQLLN	654
Fava bean type L	622:LRKFADNEDLOTQWREAKRNNKVKVAAFLRERTGYSVSPDSMFDIQVKRIHEYKRQLLN	681
Arabidopsis thaliana type L	645:LRKFADNEDLQSEWRAAKKKNKLKVVSILKERTGYTVSPDAMFDIQIKRIHEYKRQLLN	704
Spinach	654:LRKFADNEDLQSEWRAAKKKNKLKVVSILKERTGYTVSPDAMFDIQIKRIHEYKRQLLN	713
Rice type L	611:LKKFADDEDLQSEWRAAKKANKVKVVSILREKTGYIVSPDAMFDVQVKRIHEYKRQLLN	670
Rice type L2	634:LKKFADDEDLQSEWRAAKKANKVKVVSILREKTGYIVSPDAMFDVQVKRIHEYKRQLLN	693
Corn type L	666:LKKFADNEDLHSEWRAAKKANKMKVLSILREKTGYIVSPDAMFDVQVKRIHEYKRQLLN	725
Potato type H	522:LREFADNSELHAEWESAKMANKORLAQYILHVTGVSIDPNSLFDIQVKRIHEYKRQLLN	581
Fava bean type H	526:LREFADNEDLQAEWLSAKRANKORLAQYVLQVTGENIDPDSLFDIQVKRIHEYKRQLLN	585
Arabidopsis thaliana type H	525:LRFADNEELOSEWASAKTANKRLAQYIERVTGVSIDPNSLFDIQVKRIHEYKRQLLN	584
Rice type H	525:LRKFADDEKLHAEWASAKLASKRLAKHVL DVTGVTIDPNSLFDIQIKRIHEYKRQLLN	584
Wheat	516:LRKFADDEKLHAEWAAKLSAKRLAKHVL DVTGVTIDPDSLFDIQIKRIHEYKRQLLN	575
Citrus type H	524:LRFADNTELOAEWESAKMASKHLADYIWRVTGVTIDPNSLFDIQVKRIHEYKRQLLN	583
E.coli MalQ	487:LVKLADDAKFRDL YRVIKQANKVRLAEFVKVRTGIDINPQAFIDIQIKRLHEYKROHLNL	546

Positions of motif sequences 3L and 3H



Potato type L	659:FGIVYRYKKMKEMTAAERKTNFVPRVCIFGGKAFATYVQAKRIVKFI TDVGATINHDPEI	718
Potato type L2	636:FGIVYRYKKMKEMSPEERKEKFVPRVCIFGGKAFATYVQAKRIVKFI TDVGATVNHDP	695
Sweet potato type L	655:LGIYRYKKMKEMSAREAREKVFVPRVCIFGGKAFATYVQAKRIAKFI TDVGATINHDPEI	714
Fava bean type L	682:FGIVYRYKKMKEMNAAERKENFVPRVCIFGGKAFATYVQAKRIVKFI TDVGATVNHDP	741
Arabidopsis thaliana type L	705:LGIYRYKKMKEMSASEREKAFVPRVCIFGGKAFATYVQAKRIVKFI TDVASTINHDPEI	764
Spinach	714:LGIYRYKKMKEMSAAERKEKYVPRVCIFGGKAFATYVQAKRIVKFI TDVGATINHDPEI	773
Rice type L	671:LGIYRYKKMKEMSAKDRINSFVPRVCIFGGKAFATYVQAKRIVKFI TDVAATVNHDP	730
Rice type L2	694:LGIYRYKKMKEMSAKDRINSFVPRVCIFGGKAFATYVQAKRIVKFI TDVAATVNHDP	753
Corn type L	726:LGIYRYKKMKEMSTEERAKSFVPRVCIFGGKAFATYIQAQRIVKFI TDVAATVNHDS	785
Potato type H	582:LGVYRYKKLKGMSPEERKNTT-PRVTMIGGKAFATYTNAKRIVKLVDVGDDVNSDPDV	640
Fava bean type H	586:LGVYRYKKLKGMSPEERKSTT-ARTVMIGGKAFATYTNAKRIVKLVDVGDDVNSDPEV	644
Arabidopsis thaliana type H	585:LGVYRYKKLKGMSPEERKKT-PRVTMIGGKAFATYTNAKRIVKLVDVGDDVNSDPEV	643
Rice type H	585:LGAIVYRYKKLKGMSAEERQKVT-PRVTMIGGKAFATYTNAKRIVKLVDVGAVVNDPDV	643
Wheat	576:LGAIVYRYKKLKEMSAADRQKVT-PRVTMVGKAFATYTNAKRIVKLVDVGAVVNDADV	634
Citrus type H	584:LGAIVYRYKKLKEMSPQERKKT-PRVTMIGGKAFATYTNAKRIVKLVDVGAVVNDPEV	642
E.coli MalQ	547:LHILALYKEIRENPQADRV-PRVFLFGAKAAPGYLAKNIIFAINKVADVINDPLV	602

Fig. 1G

Potato type L	719:GDLLKVFVPDYNVSAEALLIPASDLSEHISTAGMEASGTSNMKFAMNGCIQIGTLDGAN 778
Potato type L2	696:GDLLKVFVPDYNVSAEVLIPGSELQHIISTAGMEASGTSNMKFSMNGCLLIGTLDGAN 755
Sweet potato type L	715:GDLLKVFVPDYNVSAEALLIPASGLSQHIISTAGMEASGTSNMKFAMNGCILIGTLDGAN 774
Fava bean type L	742:GDLLKVFVPDYNVSAEMLIPASELSQHIISTAGMEASGTSNMKFAMNGCQLIGTLDGAN 801
Arabidopsis thaliana type L	765:GDLLKVFVPDYNVSAEALLIPASELSQHIISTAGMEASGTSNMKFSMNGCVLIGTLDGAN 824
Spinach	774:GDLLKVFVPDYNVSAEALLIPASELSQHIISTAGMEASGTSNMKFSMNGCILIGTLDGAN 833
Rice type L	731:GDLLKVFVPDYNVSAEALLIPASELSQHIISTAGMEASGTSNMKFAMNGCILIGTLDGAN 790
Rice type L2	754:GDLLKVFVPDYNVSAEALLIPASELSQHIISTAGMEASGTSNMKFAMNGCILIGTLDGAN 813
Corn type L	786:GDLLKVFVPDYNVSAEALLIPASELSQHIISTAGMEASGTSNMKFAMNGCILIGTLDGAN 845
Potato type H	641:NDYLKVFVPDYNVSAEMLIPGSELQHIISTAGMEASGTSNMKFALNGCLIGTLDGAN 700
Fava bean type H	645:NSYLKVFVPDYNVSAEVLIPGSELQHIISTAGMEASGTSNMKFALNVLIGTLDGAN 704
Arabidopsis thaliana type H	644:NEYLKVFVPDYNVSAEMLIPGSELQHIISTAGMEASGTSNMKFALNGCLIGTLDGAN 703
Rice type H	644:NKYLKVFVPDYNVSAEVLIPGSELQHIISTAGMEASGTSNMKFSLNGCVIGTLDGAN 703
Wheat	635:NKYLKVFVPDYNVSAEVLIPGSELQHIISTAGMEASGTSNMKFSLNGCVIGTLDGAN 694
Citrus type H	643:NSYLKVFVPDYNVSAEALLIPGSELQHIISTAGMEASGTSNMKFSLNGCILIGTLDGAN 702
E.coli MalQ	603:GDKLKVFVLPDYCVSAAEKLIPADISEQISTAGKEASGTGNMKLALNGALTVGTLDGAN 662
Potato type L	779:VEIREEVGEENFFLFQAQAEIAGLR-KERADGKFVPDRFEEVK--EFVRSQVFGSYN- 834
Potato type L2	756:VEIREEVGEDNFFLFQAQAEIAGLR-KERAEGKFVPDRFEEVK--AFIRTVGFVTYN- 811
Sweet potato type L	775:VEIROEVGEENFFLFQAQAEIAGLR-KERAEGKFVPDRFEEVK--EFIKRGVFGSNT- 830
Fava bean type L	802:VEIREVGADNFFLFQAKAREIVGLR-KERARGKFVPDRFEEVK--KFVRSQVFGSYN- 857
Arabidopsis thaliana type L	825:VEIREEVGEENFFLFQAKADQIVNLR-KERAEGKFVPDPTFEEVK--KFVGSQVFGSNS- 880
Spinach	834:VEIREEVGEDNFFLFQARAHDIAGLR-KERAEGKYVPDPCFEEVK--EYVRSQVFGSNS- 889
Rice type L	791:VEIREEVGEENFFLFQAQAEIAGLR-KERAQGFVPDRFEEVK--RFVRSQVFGTYN- 846
Rice type L2	814:VEIREEVGEENFFLFQAQAEIAGLR-KERAQGFVPDRFEEVK--RFVRSQVFGTYN- 869
Corn type L	846:VEIREEVGEENFFLFQAQAEIAGLR-KERAEGKFVPDRFEEVK--EFVRSQVFGTYS- 901
Potato type H	701:VEIREEIGEDNFFLFGATADEVPQLR-KDRENGLFKPDPRFEEAK--QFIRSGAFGTYS- 756
Fava bean type H	705:VEIREEIGENFFLFGATADEVPRLR-KERENGLFKPDPRFEEAK--KFIRSGVFGSYD- 760
Arabidopsis thaliana type H	704:VEIREEVGEENFFLFGATADQVPLR-KEREDGLFKPDPRFEEAK--QFVKSQVFGSYD- 759
Rice type H	704:VEIREEVGEENFFLFQAKADQVAGLR-KDRENGLFKPDPRFEEAK--QLIRSGAFGTYS- 759
Wheat	695:VEIREEVQDNFFLFQAKADQVAGLR-KDRENGLFKPDPRFEEAK--QFIRSGAFGTYS- 750
Citrus type H	703:VEIROEIGENFFLFQAGADQVPLR-KEREDGLFKPDPRFEEAK--QFIRSGAFGSYD- 758
E.coli MalQ	663:VEIAEKVGEENIFIFGHTYKQVKAILAKGYDPVKKKKDKVLDAVLKELES-GKYSQDGD 721

Fig. 1H



Potato type L	835:--YDDLIGSLEGNEGFRADYFLVGKDFPSYIECQEKVDEAYRDQKRWTTMSILNTAGSY	892
Potato type L2	812:--YEELMGSLEGNEGGRADYFLVGKDFPDYIECQDKVDEAYRDQKRWTKMSILNTAGSF	869
Sweet potato type L	831:--YDELLGSLEGNEGFRADYFLVGKDFPSYIECQEKVDEAYRDQKIWTRMSILNTAGSY	888
Fava bean type L	858:--YDELLGSLEGNEGFRADYFLVGQDFPSYLECQEEVDKAYRDQKKWTRMSILNTAGSS	915
Arabidopsis thaliana type L	881:--YDELLGSLEGNEGFRADYFLVGKDFPSYIECQEKVDEAYRDQKRWTRMSIMNTAGSF	938
Spinach	890:--YDELLGSLEGNEGFRADYFLVGKDFPSYVECCQEQVDQAYRDQKKWTRMSILNTAGSF	947
Rice type L	847:--YDDLMSLEGNEGGRADYFLVGKDFPSYIECQEKVDKAYRDQKLWTRMSILNTASSS	904
Rice type L2	870:--YDDLMSLEGNEGGRADYFLVGKDFPSYIECQEKVDKAYRDQKLWTRMSILNTASSS	927
Corn type L	902:--YDELLMSLEGNEGGRADYFLVGKDFPSYIECQEKVDEAYRDQKLWTRMSILNTAGSS	959
Potato type H	757:--YNPLLESLEGNSGYGRGDYFLVGHDFPSYMDAQARVDEAYKDRKRWIKMSILSTSGSG	814
Fava bean type H	761:--YNPLLSLEGNSGYGRGDYFLVGYDFPSYMDAQAKVDEAYKDRKRWIKMSILSTAGSG	818
Arabidopsis thaliana type H	760:--YGPLLDSLEGNTGFRGDYFLVGYDFPSYMDAQAKVDEAYKDRKRWIKMSILSTAGSG	817
Rice type H	760:--YAPLLDSLEGNSGFRGDYFLVGYDFPSYIDAAQVDDEAYKDKKKWIKMSILNTAGSG	817
Wheat	751:--YTPLLDSLEGNTGFRGDYFLVGYDFPSYIDAAQVDDEAYKDKKKWIKMSILNTAGSG	808
Citrus type H	759:--YNPLLSLEGNTGYGRGDYFLVGYDFPSYLEAQDRVDQAYKDRKRWIKMSILSTAGSG	816
E.coli Mal0	722:HAFDQMLHSIGKGG--DP--YLVMA--DFAAYVEAQKQVDVLYRDQEAWTRAAILNTARCG	777
Potato type L	893:KFSSDRTIHEYAKDIW--NIEAVEIA	916
Potato type L2	870:KFSSDRTIHOYARDIW--RIEPVELP	893
Sweet potato type L	889:KFSSDRTIHEYAKDIW--NIQPVVFP	912
Fava bean type L	916:KFSSDRTIHEYAREIW--NIEPVKLE	939
Arabidopsis thaliana type L	939:KFSSDRTIHEYAKDIW--NIKQVELP	962
Spinach	948:KFSSDRTIHOYAKDIW--NIHPVMLP	971
Rice type L	905:KFNSDRTIHEYAKDIW--DIKPVILP	928
Rice type L2	928:KFNSDRTIHEYAKDIW--DIKPVILP	951
Corn type L	960:KFSSDRTIHEYAKDIW--DISPAILP	983
Potato type H	815:KFSSDRTISQYAKEIW--NIAECRVP	838
Fava bean type H	819:KFSSDRTIAQYAKEIW--NIEECRVP	842
Arabidopsis thaliana type H	818:KFSSDRTIAQYAKEIW--NIEACPVP	841
Rice type H	818:KFSSDRTIAQYAKEIW--GITASPVs	841
Wheat	809:KFSSDRTIDQYAKEIW--GISACPVP	832
Citrus type H	817:KFSSDRTIAQYAKEIW--NITECRTS	840
E.coli Mal0	778:MFSSDRSIRDYQARIWQAKR-----	797

Fig. 11

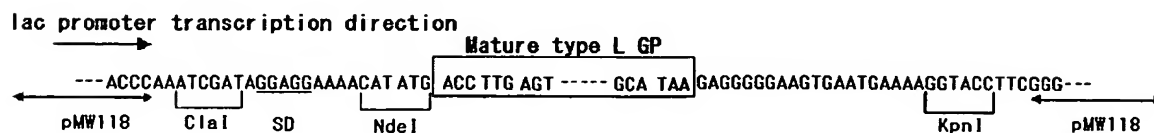


Fig. 2

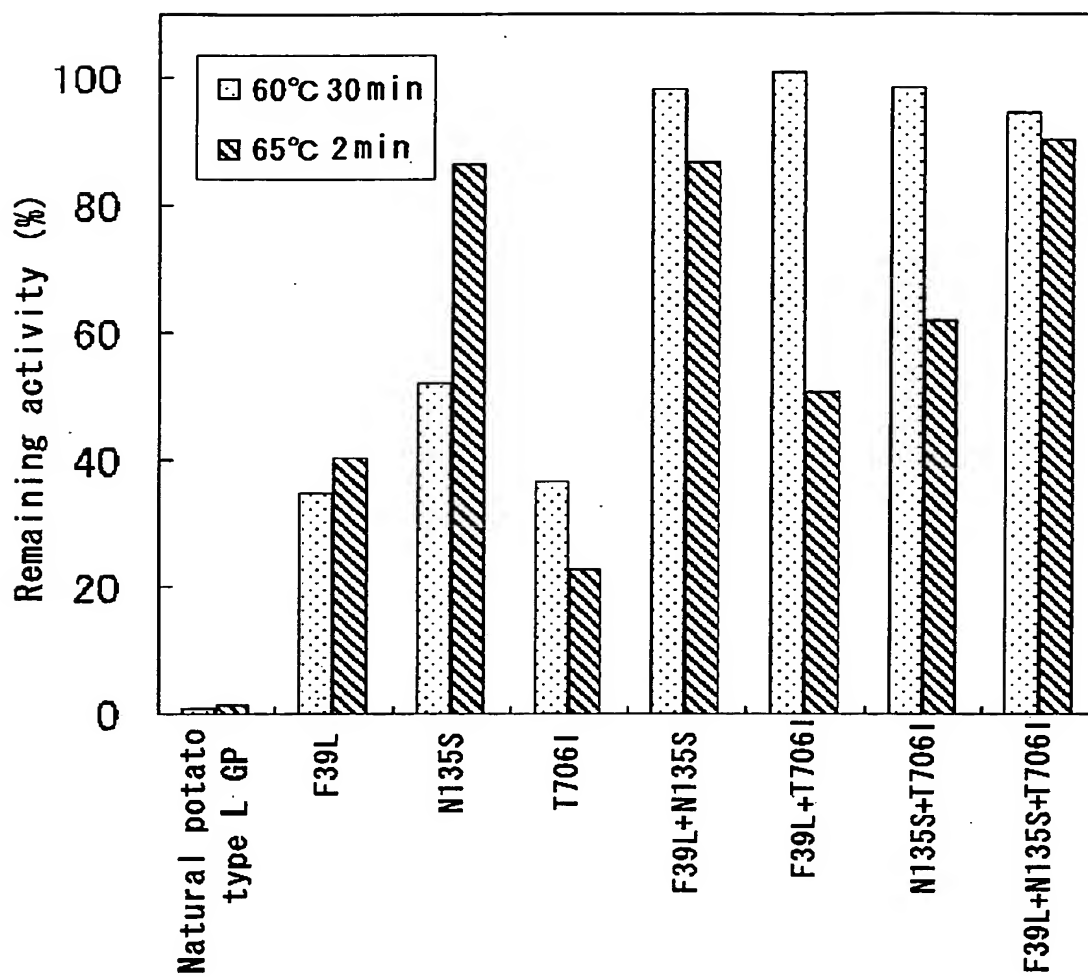


Fig. 3

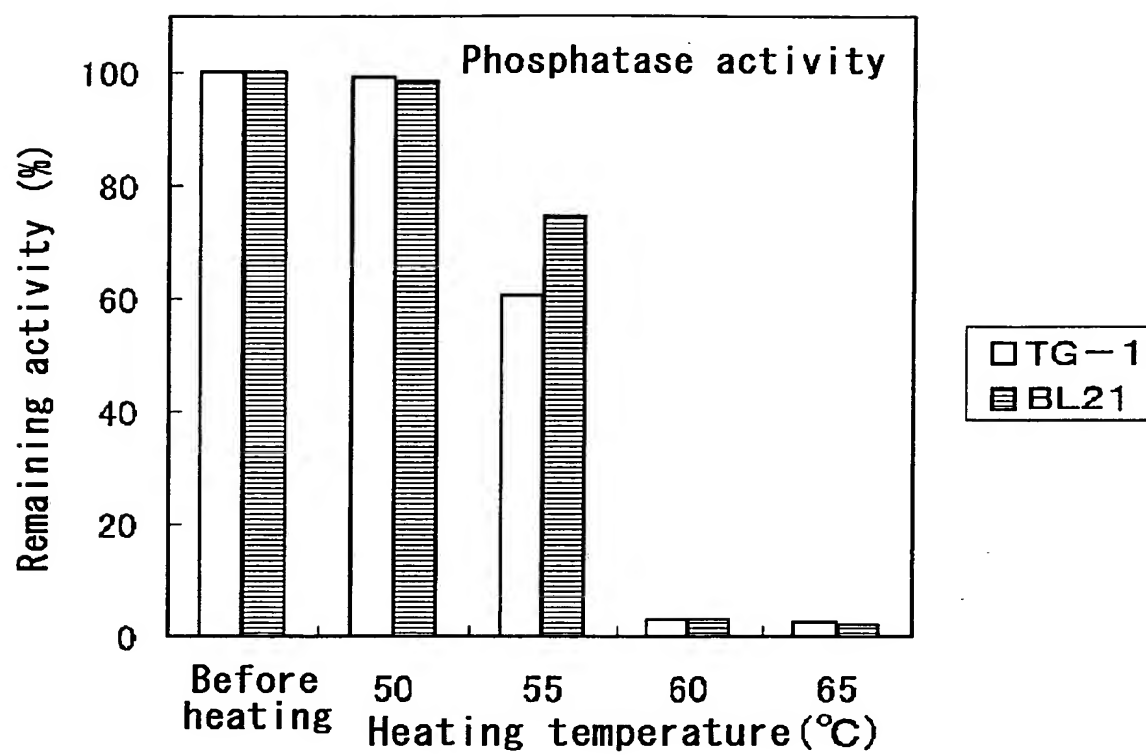


Fig. 4

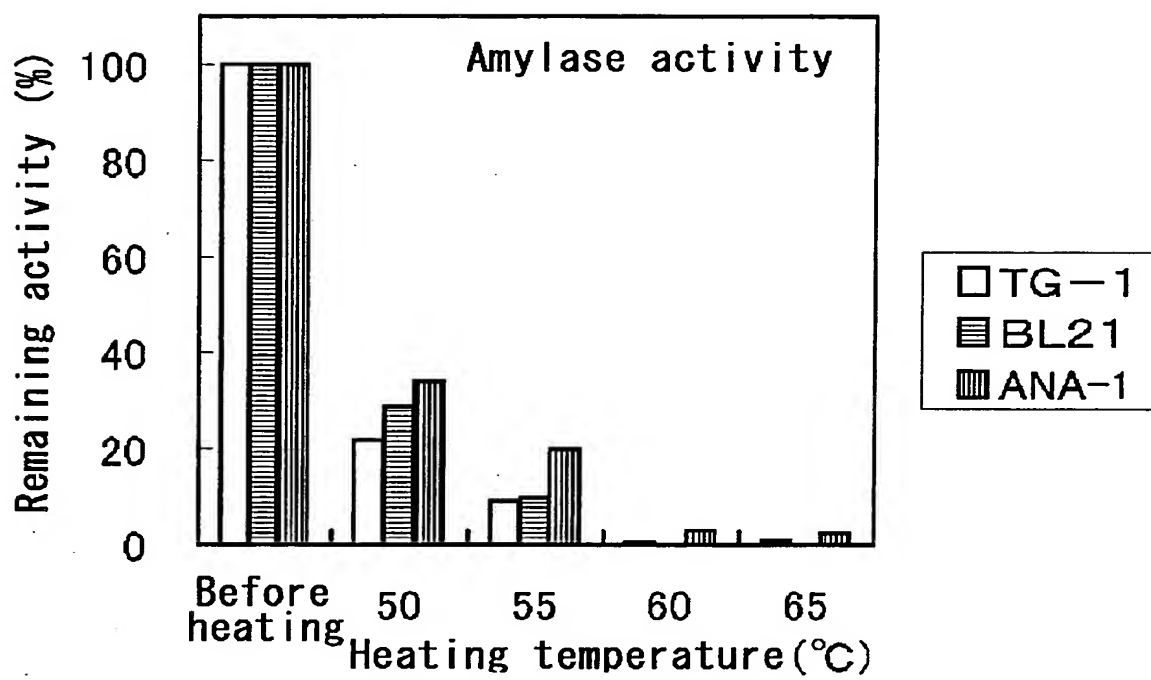


Fig. 5

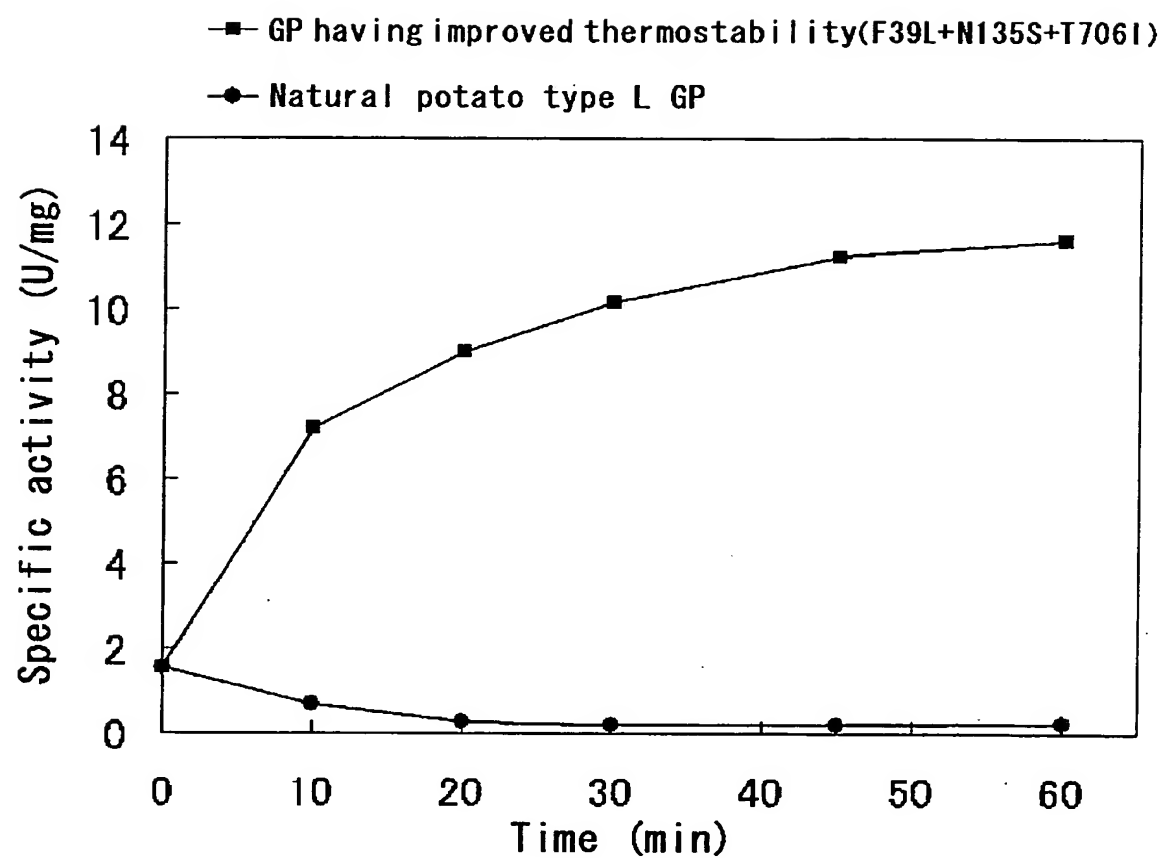


Fig. 6

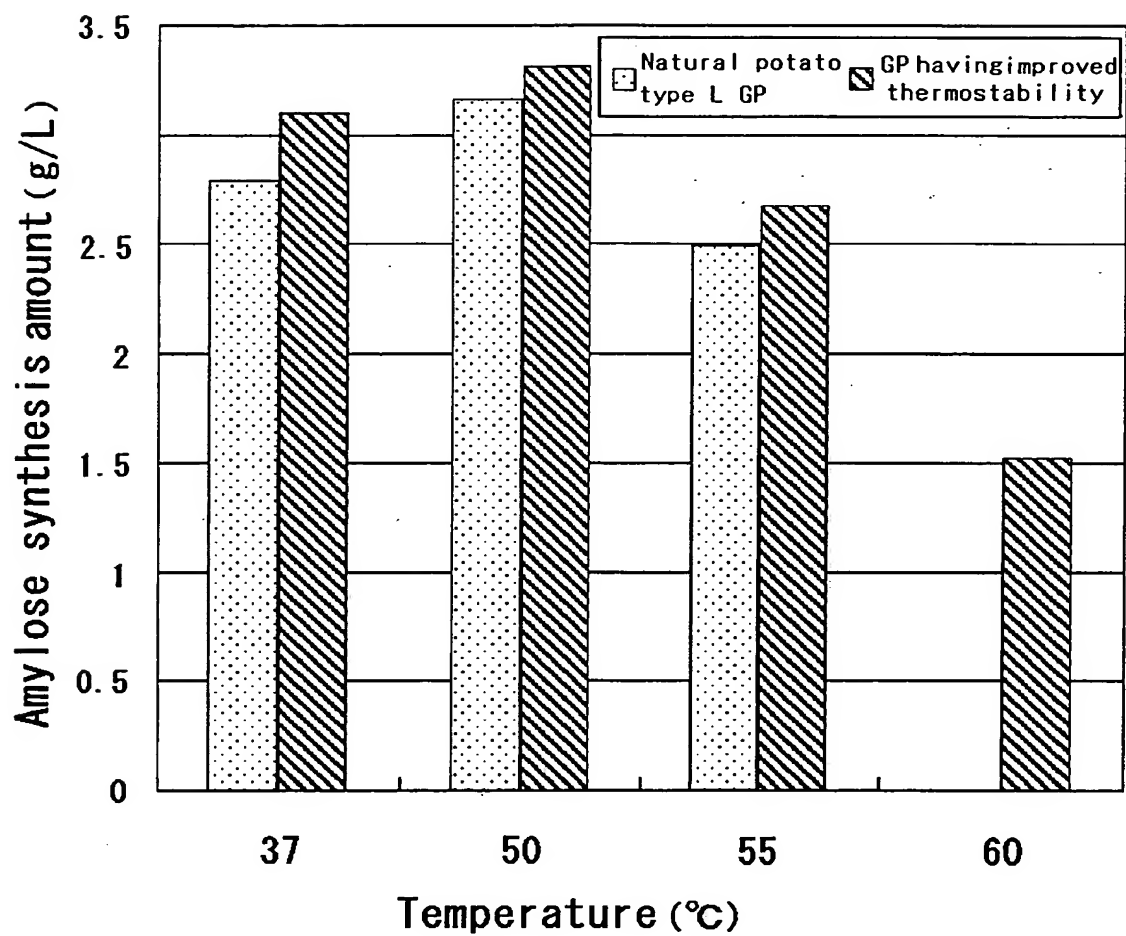


Fig. 7

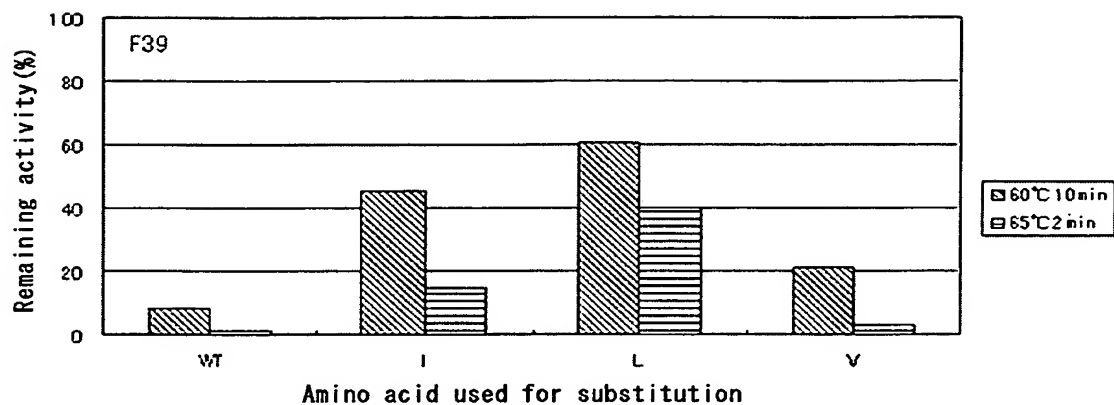


Fig. 8

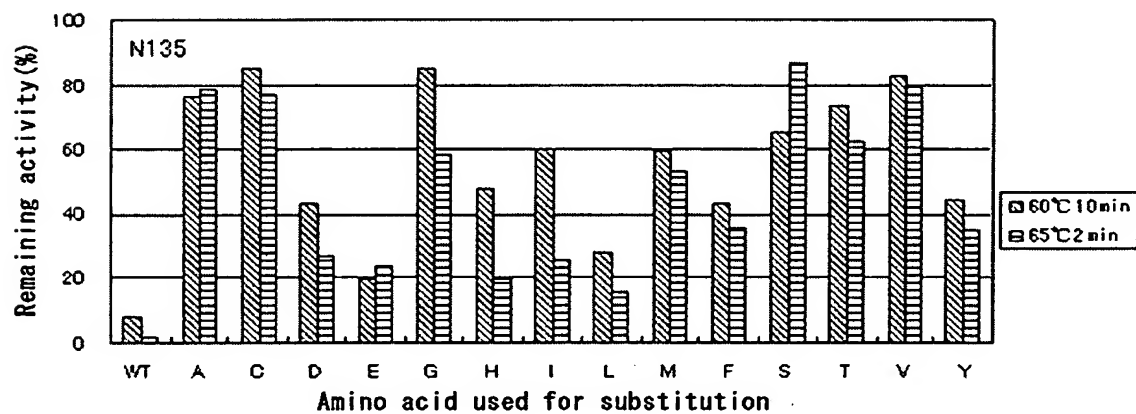


Fig. 9

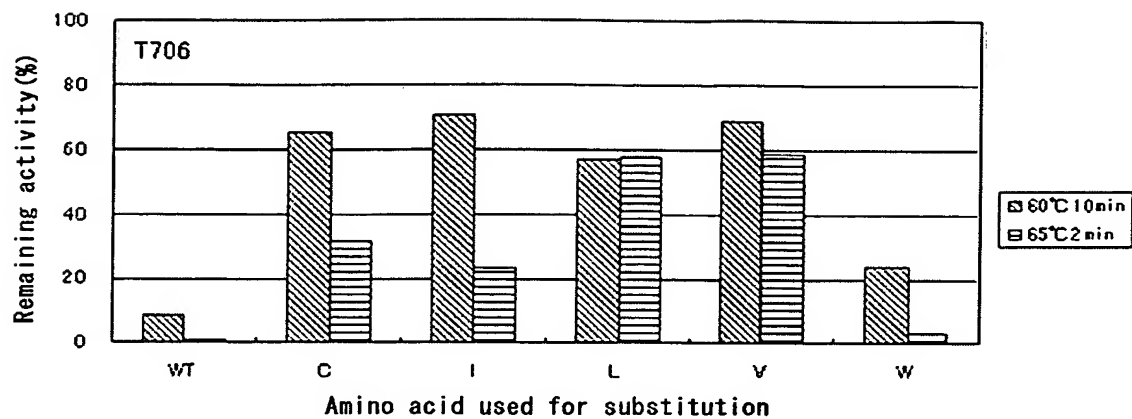
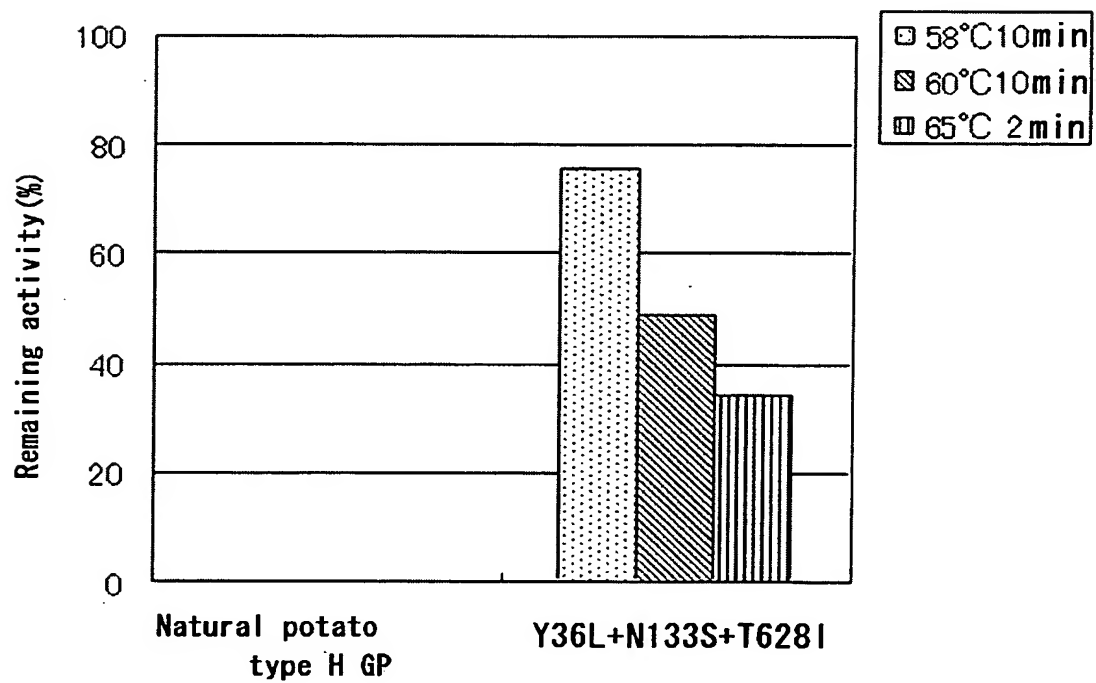


Fig. 10



Remaining activity of Potato type H GP (%)

Fig. 11



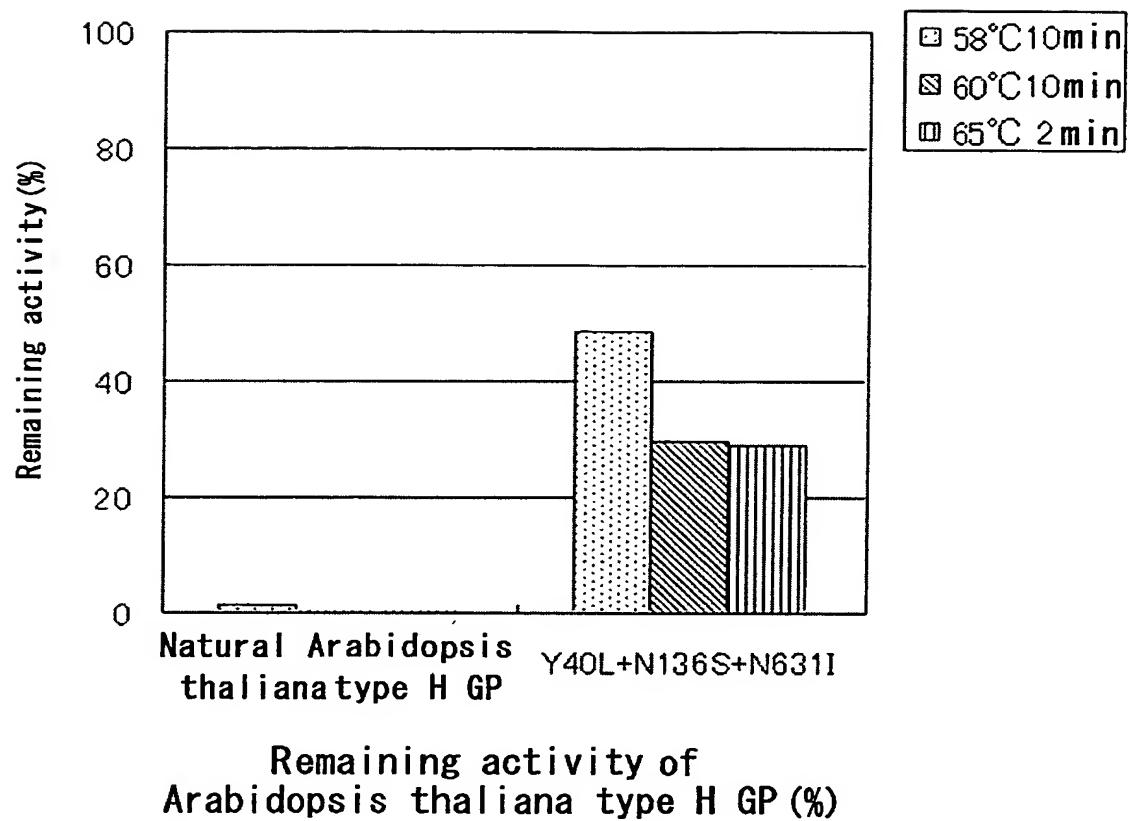
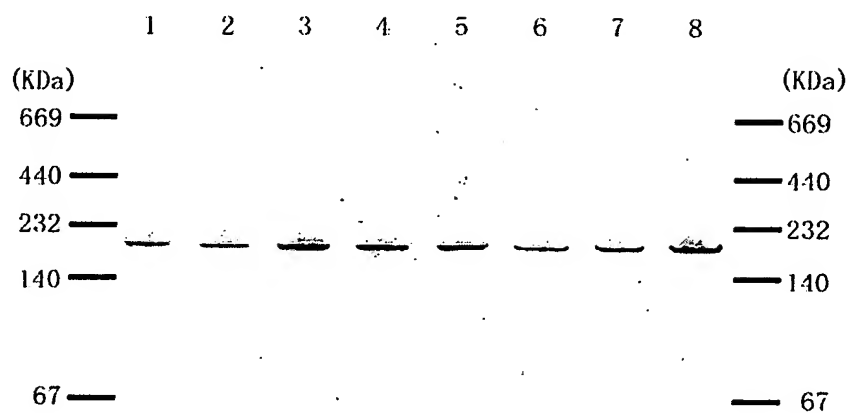
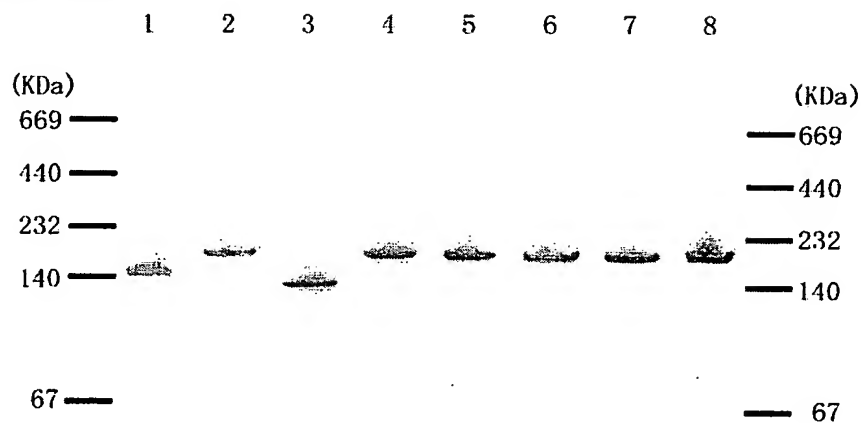


Fig. 12

## &lt;Immediately after purification&gt;



## &lt;4°C 5 months&gt;



1 : Wild type    2 : F39L    3 : N135S    4 : T706I    5 : F39L+N135S  
6 : F39L+T706I    7 : N135S+T706I    8 : F39L+N135S+T706I

**Fig. 13**